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EXAMINER	
BERNSTEIN, DANIEL A	

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3743	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/550,575	MUSA ET AL.	
	Examiner	Art Unit	
	DANIEL A. BERNSTEIN	3743	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *28 August 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-44* is/are pending in the application.

4a) Of the above claim(s) *1-15* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *16-44* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *21 September 2005* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *09/21/2005*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Election/Restrictions

1. Restriction is required under 35 U.S.C. 121 and 372.

This application contains the following inventions or groups of inventions which are not so linked as to form a single general inventive concept under PCT Rule 13.1.

In accordance with 37 CFR 1.499, applicant is required, in reply to this action, to elect a single invention to which the claims must be restricted.

Group 1, claim(s) 1-15, drawn to the method of reducing combustion residues in exhaust gases.

Group 2, claim(s) 16-44, drawn to the apparatus for reducing combustion residues in exhaust gases.

2. The inventions listed as Groups 1 and 2 do not relate to a single general inventive concept under PCT Rule 13.1 because, under PCT Rule 13.2, they lack the same or corresponding special technical features for the following reasons: Group 1 recites feeding means, means to supply energy and means to transform energy, all of which are not recited in Group 2 and therefore the two groups do not claim a single general inventive concept and are subject to an election restriction.

3. A telephone call was made to Bryan Santarelli on 01/27/2009 to request an oral election to the above restriction requirement and an election was made electing group 2 without traverse.

Claim Rejections - 35 USC § 112

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claim 22 rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claim 22 recites the limitation "preferably", it is unclear whether the claim is directed towards preheating the exhaust gases to approximately 400 degrees C or a range of 400-700 degrees C.

6. Claim 27 recites the limitation "said filtering device". There is insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 102

> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

7. Claims 16-17, 21-26, 28-32, 34, 39 and 41-43 rejected under 35 U.S.C. 102(b) as being anticipated by US 5,460,511 to Grahn (Grahn).

Grahn teaches:

In Reference to Claim 16

An apparatus for reducing combustion residues, particularly pollutants, in exhaust gases generated from the combustion of fuel, including a system for the treatment of exhaust gases before releasing them in the environment (see afterburner, Fig. 1), wherein said exhaust gases treatment system includes a radiant combustion reactor (combustion chamber 11) wherein the exhaust gases pass through (exhaust travels through the exhaust manifold and passes through heat exchanger 12 to combustion chamber 11), in order to be submitted to radiant energy (chamber 11 is heated by heating element 15, which is a 1200 watt electric stove surface heating element mounted to the external outside wall

of combustion chamber 11) for raising the exhaust gases temperature to a value sufficient to cause self-combustion (the heating element raises the temperature to the operating temperature of the afterburner), thereby a post-combustion process of the exhaust gases is performed before releasing them in the environment (Col. 3 lines 50-65).

In Reference to Claim 17

The apparatus according to claim 16, in which within the radiant combustion reactor the exhaust gases temperature is increased to a value in the range from approximately 250.degree. C. to approximately 1800.degree. C. (see claim 2, where the afterburner temperature is maintained between 600 and 800 degrees Celsius), Particularly from approximately 400.degree. C. to approximately 1400.degree. C., preferably from approximately 900.degree. C. to approximately 1200.degree. C., more preferably from approximately 900.degree. C. to approximately 1100.degree. C.

In Reference to Claim 21

The apparatus according to any one of claims 16, further including a pre-heating chamber (below 11 in Fig. 1, chamber 16 contains heat exchanger 12, which pre-heats incoming exhaust gases), upstream the radiant combustion reactor (heat exchanger 12 heats exhaust before it enters 11 for post-combustion), for pre-heating the exhaust gases before performing the post-combustion process.

In Reference to Claim 22

The apparatus according to claim 21, in which in said pre-heating chamber the exhaust gases are pre-heated to a temperature over approximately 400.degree. C. (the exhaust gases are heated in the heat exchanger 12 to temperatures approaching that of the gases exiting the combustion chamber 11, Grahn states that realistically 85% of the temperature of the exiting gases of 11, Col. 4 lines 1-30, furthermore, the phrase “approximately 400 degrees C” doesn’t narrow or limit the temperature, any raise in temperature would read on this claim), preferably in the range from approximately 400.degree. C. to approximately 700.degree. C.

In Reference to Claim 23

The apparatus according to claim 21, in which said pre-heating chamber (16) includes a device for accelerating and compressing the exhaust gases (Fig. 5 shows a fan 33 that forces air into the exhaust pipe which will help to accelerate the exhaust gases), particularly one or more among a fan or an arrangement of fans, a turbine, a turbo compressor.

In Reference to Claim 24

The apparatus according to claim 23, in which said pre-heating chamber further includes a Venturi tube (venture air intake, Col. 4 line 1) for further accelerating the exhaust gases.

In Reference to Claim 25

The apparatus according to claim 16, further including a heat-exchange device (12) downstream the radiant combustion reactor, for lowering the exhaust gases temperature (inherently when heat transfers from post-combustion gases exiting the combustion chamber 11 to exhaust gases entering the chamber, the temperature of post-combustion gases will decrease) after performing the post-combustion process before releasing the post-combusted exhaust gases in the environment.

In Reference to Claim 28

The apparatus according to claims 25, in which said heat-exchange device (12) is operatively coupled with the pre-heating chamber (the heat exchanger is located within the pre-heating chamber 16), so that the heat released by the post-combusted exhaust gases in the heat-exchange device is exploited for pre-heating the exhaust gases in the pre-heating chamber (post-combustion gases transfer heat to incoming exhaust gases before the exhaust reaches the combustion chamber 11 for post-combustion, see Fig. 1).

In Reference to Claim 29

The apparatus according to claims 16, further including a control unit (temperature control unit 25 is electrically connected to control the heating element 15), particularly an electronic, programmable control unit, for the post-combustion process control.

In Reference to Claim 30

The apparatus according to of claims 16, in which the radiant combustion chamber includes an enclosed path (exhaust gases flow directly through the heat exchanger tubes to combustion chamber 11, the combustion chamber 11 and the heat exchanger 12 define an enclosed path, see Fig. 1) for the exhaust gases, and a heating device (15 heats the outer walls of the combustion chamber 11) associated with the enclosed path for heating walls.

In Reference to Claim 31

The apparatus according to claim 30, in which said heating includes Joule-effect heaters (electric heater 15 which is a 1200 watt electric stove heating element, all electric heaters inherently use electrical resistors which work on the principle of Joule heating, Col. 5 lines 30-40).

In Reference to Claim 32

The apparatus according to claim 31, in which said enclosed path includes system of ducts (Fig. 1 shows a series of ducts directing exhaust gases in the afterburner) including at least one duct for the passage of the exhaust gases (only exhaust gases flow through the afterburner of Grahn), and having associated therewith electrical resistors (electric heater 15 inherently has electrical resistors) for heating the duct walls (15 heats the walls of chamber 11 which makes up part of the duct walls).

In Reference to Claim 34

The apparatus according to claim 31, comprising an arrangement of ducts associated with at least one heat radiating panel (the heating element 15 is mounted on the outside of the duct wall of chamber 11), having embedded therewith a Joule-effect heat generator (electric heaters work on the principle of Joule heating and inherently generate heat).

In Reference to Claim 39

The apparatus according to claims 16, in which a gases separation system is provided within the radiant combustion reactor (when the exhaust enters the heat exchanger it is separated into a series of heat exchange tubes, and when exhaust leaves chamber 11 it is directed back down the heat exchange tubes, and therefore the tubes are determining a separation of paths during different phases of the post-combustion process, see Fig. 1) for determining a separation of different parts of the exhaust gases undergoing different phases of the post-combustion process.

In Reference to Claim 41

A system including a fuel combustion apparatus in which a fuel combustion process takes place, and an apparatus for treating exhaust gases originated by the combustion process (see Fig. 1), wherein said apparatus for treating the exhaust gases includes a radiant combustion reactor (combustion chamber 11 has an electric heater 15 which supplies radiant heat to an outer wall) wherein the exhaust gases are caused to pass through (exhaust travels through the exhaust manifold and passes through heat exchanger 12 to

combustion chamber 11), to be submitted to radiant energy (chamber 11 is heated by heating element 15, which is a 1200 watt electric stove surface heating element mounted to the external outside wall of combustion chamber 11) for increasing the exhaust gases temperature to a value sufficient to cause self-combustion (the heating element raises the temperature to the operating temperature of the afterburner), thereby a post-combustion process of the exhaust gases is performed before releasing them in the environment (Col. 3 lines 50-65).

In Reference to Claim 42

The system according to claim 41, in which said fuel combustion apparatus is an internal combustion engine (Col. 7, lines 5-10), particularly a vehicle engine.

In Reference to Claim 43

The system according to claim 41, in which said fuel combustion apparatus is a burner (Col. 7 lines 10-15) of heating system.

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

9. Claim 26 rejected under 35 U.S.C. 103(a) as being unpatentable over Grahn.

In Reference to Claim 26

Grahn discloses the apparatus according to claim 25, in which the heat-exchange device is adapted to lower the temperature of the post-combusted exhaust gases (inherently when heat transfers from post-combustion gases exiting the combustion chamber 11 to exhaust gases entering the chamber, the temperature of post-combustion gases will decrease). Grahn does not teach lowering the exhaust gases to a value in the range from approximately 50.degree. C. to approximately 150.degree. C.

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to optimize the heat exchanger for the purpose of lowering the exhaust gas temperature to approximately 50.degree. C. to approximately 150.degree. C. Sizing the heat exchanger to optimize the range of the temperature of exhaust gases exiting the afterburner is an obvious design choice that would not require undue experimentation nor lead to unexpected results. Therefore, designing the heat exchanger to cool exhaust exiting the afterburner to a particular temperature would have been within the capabilities of someone of ordinary skill in the art and merely an obvious design choice.

10. Claim 18 rejected under 35 U.S.C. 103(a) as being unpatentable over Grahn in view of US 3,666,422 to Rossel (Rossel).

In Reference to Claim 18

Grahn discloses the apparatus according to claim 16, but does not teach further including a filtering device adapted to substantially eliminate residual uncombusted dust and particulate material present in the exhaust gases, said filtering device being located at least downstream the radiant combustion reactor.

Rossel teaches a filtering device located upstream from an afterburner (see Fig.1) for the purpose of filtering the post-combusted gas and thereby further removing toxins and pollutants.

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to combine Grahn with Rossel for the purpose of providing the afterburning system of Grahn with a filter to remove toxins and pollutants from the post-combusted gases. All of the claimed elements were known in prior art and one skilled in the art could have combined the elements as claimed by known methods with no change in their respective functions, and the combination would have yielded predictable results to one of ordinary skill in the art at the time of the invention.

11. Claim 19, 20 and 27 rejected under 35 U.S.C. 103(a) as being unpatentable over Grahn in view of Rossel and in further view of US 3,822,653 to Ghelfi (Ghelfi).

In Reference to Claim 19

Grahn in view of Rossel discloses the apparatus according to claim 18, but does not teach where said radiant combustion reactor includes two chambers at the end, one downstream the other, the filtering device being additionally located between the two chambers.

Ghelfi teaches a post-combustion chamber 9 that is divided into multiple chambers by filters (partition walls 14) that are disposed between them for the purpose of absorbing gaseous or vaporous impurities (the walls act as catalytic filters, Col. 2 lines 58-68).

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to combine Grahn in view of Rossel with Ghelfi for the purpose of providing the post-combustion chamber 11 of Grahn with a filters dividing the combustion chamber into multiple chambers so that pollutants can be further removed from the exhaust gases. Ghelfi teaches that it is well known to someone of ordinary skill in the art to filter exhaust gases while they are traveling through a post-combustion chamber to remove pollutants from the exhaust. Therefore it would have been obvious because all of the claimed elements were known in prior art and one skilled in the art could have combined the elements as claimed by known methods with no change in their respective functions, and the combination would have yielded predictable results to one of ordinary skill in the art at the time of the invention.

In Reference to Claim 20

Grahn in view of Rossel discloses the apparatus according to claim 18, but does not teach in which the filtering device includes one or more among active filters and inactive filters (according to the specification, the filter in wall 14 is an active filter, because it acts as a catalyzer with oxidation reactions, Rossel), particularly selective filters based on ceramic and zeolite materials.

Ghelfi teaches a filtering device includes one or more among active filters and inactive filters (according to the specification, the filter in wall 14 of Rossel is an active filter, because it acts as a catalyzer with oxidation reactions).

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to combine Grahn in view of Rossel with Ghelfi for the purpose of providing the post-combustion chamber 11 of Grahn with a filter that can act as a catalyzer and facilitate oxidation reactions. Ghelfi teaches that it is well known to someone of ordinary skill in the art to filter exhaust gases while they are traveling through a post-combustion chamber to remove pollutants from the exhaust. Therefore it would have been obvious because all of the claimed elements were known in prior art and one skilled in the art could have combined the elements as claimed by known methods with no change in their respective functions, and the combination would have yielded predictable results to one of ordinary skill in the art at the time of the invention.

12. Claim 27 rejected under 35 U.S.C. 103(a) as being unpatentable over Grahn in view of Ghelfi.

In Reference to Claim 27

Grahn discloses the apparatus according to claim 25, but does not teach where said heat-exchange device is placed downstream said filtering device.

Ghelfi teaches a post-combustion chamber 9 that is divided into multiple chambers by filters (partition walls 14) that are disposed between them for the purpose of absorbing gaseous or vaporous impurities (the walls act as catalytic filters, Col. 2 lines 58-68).

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to combine Grahn with Ghelfi for the purpose of providing the post-combustion chamber 11 of Grahn with a filter dividing the combustion chamber into two chambers so that pollutants can be removed from the exhaust gases before entering the heat exchanger and to prevent residue from clogging the heat exchanger. Ghelfi teaches that it is well known to someone of ordinary skill in the art to filter exhaust gases while they are traveling through a post-combustion chamber to remove pollutants from the exhaust. Therefore it would have been obvious because all of the claimed elements were known in prior art and one skilled in the art could have combined the elements as claimed by known methods with no change in their respective functions, and the combination would have yielded predictable results to one of ordinary skill in the art at the time of the invention.

The combination of Grahn with Ghelfi modifies the post-combustion chamber of Grahn so that said heat-exchange device (12) is placed downstream said filtering device. Exhaust gases enter the first post-combustion chamber,

pass through the filter to the second post-combustion chamber, and then pass through the heat exchanger located downstream the modified chamber 11 of Grahn.

16. Claim 33 rejected under 35 U.S.C. 103(a) as being unpatentable over Grahn in view of US 3,741,730 to Alcott (Alcott).

In Reference to Claim 33

Grahn discloses the apparatus according to claim 32, but does not teach in which said arrangement of ducts comprises at least one among a substantially "U"-shaped, a substantially double "U"-shaped or a substantially "W"-shaped arrangement of ducts, at least one of said ducts having wound around it at least one spiral resistor controllably powered for heating the duct walls. Grahn does teach a spiral resistor (heating element 15) that is used to heat the duct walls.

Alcott teaches an afterburner for combusting exhaust gases emitted from a vehicle exhaust system (see Fig. 1). The afterburner is configured in a U-shape for the purpose of having an increased cross sectional area in the direction of the gas flow from the point of combustion in order to enhance a more complete combustion of exhaust gases (Col. 2 lines 1-10).

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to combine Grahn with Alcott for the purpose of increasing the surface area in which the exhaust gases were exposed to in a post-combustion afterburner. It is well known to construct the post-combustion chamber of an afterburner in a U-shape as evidenced by Alcott.

Therefore it would have been obvious, because constructing the chamber in a U-shape is a compact solution to increasing the surface area of the afterburner combustion chamber.

17. Claims 35-38 rejected under 35 U.S.C. 103(a) as being unpatentable over Grahn in view of JP 59221523 A to Iribe et al. (Iribe).

In Reference to Claim 35

Grahn discloses the apparatus according to claim 30, but does not teach where said heating system includes an optical radiation source, particularly a laser.

Iribe teaches creating an environment where automatic ignition is possible by heating the surface of ignition member with a laser so when air and fuel gas pas over the surface the mixture is ignited (laser 5, abstract).

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to combine Grahn with Iribe for the purpose of heating the outside surface of the post-combustion chamber with a laser so that when exhaust gases pass through, spontaneous self-combustion of the gases will occur. It would have been obvious to combine Grahn with Iribe, because an electric heater and a laser are both analogous heating means and either one could be capable of performing the means for heating. Therefore, and electric heater and a laser are recognized equivalents that could be substituted for one another as heating means without expected results or undue experimentation. Even though a laser may cost more and require more

sophisticated equipment, they both perform the same function, which is heating a surface.

In Reference to Claim 36

Grahn in view of Iribe discloses the apparatus according to claim 35, in which said optical radiation source comprises at least one laser (laser oscillator 5, abstract, Iribe).

15. Claims 37 and 38 rejected under 35 U.S.C. 103(a) as being unpatentable over Grahn in view of Iribe and in further view of US 4,790,735 to Mayer (Mayer).

In Reference to Claim 37 and 38

Grahn in view of Iribe discloses the apparatus according to claim 36, but does not teach that at least one said laser is operated in pulsed mode and Grahn in view of Iribe does not teach that has an optical radiation reflecting/deflecting arrangement for reflecting/deflecting the optical radiation onto the enclosed path.

Mayer teaches a laser that pulsates at a laser pulse length of 10 ns (Col. 4 lines 65-68) that has an optical radiation reflecting/deflecting arrangement for reflecting/deflecting the optical radiation onto the enclosed path (see Fig. 2 where the laser is reflected and deflected in shell 14 to hit target 10, Col. 2 lines 64-68)

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to combine Grahn in view of Iribe for the purpose of operating the laser which heats the surface of the chamber with a pulsed mode and for directing and concentrating the laser on its respective

target. Pulsed operation of a laser is well known and obvious method to heating objects that are larger in size. Using a pulsed mode laser allows the energy to disperse and heat to be delivered to the rest of the object being heated. The actual amount of energy required can be delivered in a short time, but pulsating the laser spreads out that time so that one area does not overheat. Furthermore, it is well known to provide the laser heating arrangement with a series of reflectors for directing the laser on the target to be heated as evidenced by Mayer. All of the claimed elements were known in prior art and one skilled in the art could have combined the elements as claimed by known methods with no change in their respective functions, and the combination would have yielded predictable results to one of ordinary skill in the art at the time of the invention.

16. Claim 40 rejected under 35 U.S.C. 103(a) as being unpatentable over Grahn in view of US 2005/0005898 to Horstin (Horstin).

In Reference to Claim 40

Grahn discloses the apparatus according to claim 39, but does not teach where said gases separation system includes a rotor rotatably arranged inside the radiant combustion reactor.

Horstin teaches a rotor (41, Fig. 2 and Fig. 5) mounted in an afterburner for the purpose of accelerating exhaust gases from the combustor for post-combustion.

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to combine Grahn with Horstin for the

purpose of providing Grahn with a rotor to accelerate and move exhaust gases more efficiently through the heat exchanger and afterburner. All of the claimed elements were known in prior art and one skilled in the art could have combined the elements as claimed by known methods with no change in their respective functions, and the combination would have yielded predictable results to one of ordinary skill in the art at the time of the invention.

17. Claim 44 rejected under 35 U.S.C. 103(a) as being unpatentable over Grahn in view of US 4,481,889 to Sikander et al. (Sikander).

In Reference to Claim 44

Grahn discloses the system according to claim 41, but does not teach where said fuel combustion apparatus is a steam boiler for the production of electrical power.

Sikander teaches an after burner that can be used to burn the exhaust gases of a boiler (abstract) for the purpose of reducing pollutants released to the atmosphere.

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to use the afterburner of Grahn for the purpose of post-combusting residual gases from the exhaust of a boiler. It is well known to administer exhaust gases from a boiler to a post-combustion process to ensure complete combustion of fuel gases so that pollutants released to the atmosphere are reduced. Furthermore, Grahn teaches using an afterburner to complete combustion of exhaust gases from an internal combustion engine and a

wood burning stove. Therefore, it would have been obvious to use the afterburner of Grahn to ensure complete combustion, because whether the device is implemented on an engine, stove or boiler, exhaust gases are being released that have not experienced complete combustion.

Allowable Subject Matter

18. Claim 40 objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

19. Any inquiry concerning this communication or earlier communications from the examiner should be directed to DANIEL A. BERNSTEIN whose telephone number is (571)270-5803. The examiner can normally be reached on Monday-Friday 8:00 AM - 5:00 PM EDT.

20. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kenneth Rinehart can be reached on 571-272-4881. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

21. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

DAB

/Kenneth B Rinehart/
Supervisory Patent Examiner, Art Unit 3743